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Research Article

Analyzing Chinese Customers' Switching Intention of Smartphone Brands: Integrating the Push-Pull-Mooring Framework

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With increasing technology advancement, online shopping, and growth of affordable segment, smartphone users' switching behavior is becoming a concern for smartphone companies. To fill the research gap that persists in relation to the switching behavior of smartphone users from a multidimensional view, this study integrates the push-pull-mooring model to investigate and classify factors that affect the switching behavior of smartphone users. To test the hypotheses in relation to different predictors, data were collected from a survey of 246 users of the top ten smartphone brands in China and analyzed using structural model equation through regression analyses. The results revealed that the pull, push, and mooring factors have a significant impact on the switching behavior of smartphone users. While the pull effects have a stronger impact than push effects, the mooring factors were found to have a significant and strongest effect on smartphone users' switching behavior. In particular, subjective norm showed the greatest impact on switching behavior, product quality and obsolete features showed significant and weak impact while brand image, switching cost, and poor customer service did not show any significant impact. These findings provide useful implications and insights for smartphone brands to develop competitive strategies for customer relationship management.

1. Introduction

In the contemporary era, the use of smartphones has become an integral part of the everyday life of customers across all demographics and globally. With the increasing smartphone penetration rate, China has the highest number of mobile phone users in the world since 2012 when it became equivalent to the sum of all the European countries combined [1]. As the Chinese smartphone industry is humongous, so are the risks associated with the same. One such risk relates to the consumers' tendency to switch to another brand. In 2012, nearly 89% of the Chinese people used a mobile phone, indicating the market saturation situation in the industry [1]. Due to this, it becomes increasingly

important for smartphone brands to focus on brand loyalty in order to retain competitiveness as brand loyalty is argued to be an important determinant of the brand switching behavior of customers [2]. Moreover, with easy access of information about products and its attributes of different brands, customers' bargaining power as well as switching behavior has increased. Due to this, the need for companies to develop customer loyalty has gained the increased attention of both practitioners and academicians [3].

Brand switching behavior refers to shifting behavior by a customer from one brand to another [4]. Brand switching has become highly common in the smartphone industry due to fast-changing technology and increasing Research and Development (R&D) in this sector. Also, the availability of

substitutes and competitive pricing policy by companies plays a key role in affecting the behavior of customers while switching to another brand [3]. In such an era of cut-throat competition, it is evident that brand switching becomes a major challenge for companies, which in turn affects their long-term sustainability in the market. The customer-company relationship is hindered by brand switching and it also weakens the existing long-term commitment between customer and the company [4]. According to Sun et al. [5], switching intention from incumbents may lead to a significant decline in profits and lead to customer churn. This makes it increasingly important for smartphone brand managers to develop loyalty among customers. Moreover, the findings of this study will help brand managers to develop brand loyalty strategies and better policies for customer retention.

According to Ahmed et al. [3], new and advanced features have a significant influence on the switching behavior of smartphone users while Park et al. [6] asserted that price discounts and sales promotion offer help to the brands for moving customers from their current set of expectations to a consideration set of expectations by affecting their purchase intentions. Further, brand name or brand image can play a considerable role in influencing smartphone users to try a new brand, particularly when the customers find the newer brand more affordable [7]. Many authors have investigated factors affecting the switching behavior of smartphone users. However, no specific evidence was observed for the classification of such factors [7–9]. This study seeks to conduct an analysis of a holistic view of different categories of factors affecting the brand switching behavior of Chinese smartphone users, thereby contributing to the literature on switching behavior.

Since different factors affect different customers as per their preferences, this study seeks to use the push-pull-mooring (PPM) model to classify factors in the respective categories, i.e., push, pull, and mooring factors. Push factors refer to those factors which force an existing customer to switch to another brand due to dissatisfaction caused by using an existing brand; pull factors are those that attract a customer and lure them to buy new products while mooring factors may facilitate or obstruct a customer to switch brand [10]. The PPM model can be used to analyze the migration behavior of human beings [8]. Many researchers have conceptualized the PPM model to study the brand switching behavior of customers, which makes this model prominent in this area [5, 11, 12]. Thus, it is imperative to use the PPM model which classifies factors in groups and helps to better understand their implications in brand switching behavior. Moreover, among the previous studies investigating smartphone brand switching behavior, most of the research studies were exclusive in nature; i.e., they generally focused on certain factors and their impact on brand switching without having focused on categorization or classification [8, 9]. Therefore, this study seeks to extend the scope of existing literature by studying the brand switching behavior of smartphone users by integrating the PPM model.

We propose that the PPM model can be used as a significant theoretical lens in this study to understand different

factors affecting the brand switching behavior of smartphone users across different categories, namely, push, pull, and mooring factors. This model will help to explain why customers migrate from one brand to another over an extended period of time [10]. Consequently, we identify key predictors of brand switching behavior used in the migration literature and fit those into a unifying model to understand the switching behavior of smartphone brand users, which will create useful insights for marketers about their existing as well as potential customers, thereby assisting to develop better business strategies.

This paper is systematically organized into 5 sections as follows. In Section 2, a critical literature review on switching behavior has been conducted. Section 3 comprises the methodology used to conduct this research including instrument development, data collection, and analysis procedures. Section 4 presents findings of data collected from the survey and the last section discusses the findings in light of existing literature and the implications of such findings. In addition, limitations of this study are discussed along with directions for future research in this area.

2. Literature Review

2.1. Brand Switching Behavior. Brand switching occurs when customers shift to another brand within the same category of products [13]. Brand switching behavior can be considered as the opposite of customer loyalty as loyal customers tend to remain associated with the brand [14]. In today's era, when customers have easy access to market information and knowledge about the latest products, it becomes increasingly important for companies to create as well as maintain a favorable image of their products in the market at all times. This is because customers tend to compare different products across different brands and take their switching or purchase decisions. Due to this, companies are constantly trying to deliver better offerings, provide increased value to the customers against the price, and maintain a healthy and long-term relationship with them [3]. In this regard, Bassey et al. [15] highlighted that brand switching can be temporary or permanent, depending upon the type and nature of the product and difficulty in switching to another brand. In this context, Hou et al. [14] mentioned that temporary brand migrants return to their original preferences after a certain time period, while permanent brand migrants do not return to the incumbent service. Needless to mention, permanent brand switching can cause significant losses to companies in terms of user churn. Thus, brand switching can be considered as a behavior in which customers switch their relationship across brands.

Nimakoto and Winneba [13] argued that brand switching can either bring new customers to the companies through in-switching or can cause loss of customers to competitors due to out-switching. This makes switching behavior a crucial concept in the business community and business marketing as companies can leverage on this concept to evaluate their customer base and attract new customers. At the same time, companies may also lose their existing customers to their competitors due to the attractive brand and marketing strategies of the competitors [16]. Considering the significance of brand switching,

many authors have investigated the brand switching behavior of smartphone users who studied individualistic factors and their direct impact on the brand switching behavior through cause and effect relationship [7, 8]. The literature on the macroscopic analysis of such factors affecting the brand switching behavior of smartphone users is still undeveloped. Through this study, we intend to bridge the research gap and provide a holistic view at the macrolevel by applying the push-pull-mooring model to comprehensively study the brand switching behavior of smartphone users.

2.2. Push-Pull-Mooring (PPM) Model. The traces of the PPM model were found in “Laws of Migration,” introduced back in 1885 which ultimately became the founding knowledge in the literature of migration behavior [17]. The PPM model, which originated from migration theory, can prove to be a useful tool to understand the switching behavior because migration is not limited to places, and it could occur in the context of brand switching as well. The PPM model has been considered as a prominent framework to analyze why people migrate from one state to another in terms of push, pull, and mooring factors. Push factors in the PPM framework refer to negative factors that drive away a person from the original location while pull factors are positive factors which attract a person to move to a new location. On the other hand, mooring factors can be considered as those factors that either facilitate or obstruct decision making while migrating from one brand to another brand [18]. For instance, switching cost and personal preferences can be considered as mooring factors in the context of the smartphone industry.

Bansal et al. [10] emphasized on the close link between migration behavior and switching behavior and extended the use of the PPM model to the service industry. The literature shows huge evidence of the application of the PPM model across different industries and users of products as well as services. For instance, Hsieh et al. [11] applied the PPM model to analyze the postadoption switching behavior in online service substitutes. Jung et al. [18] conducted an extensive research on switching behavior in the airline industry through the perspective of the PPM model and found that all PPM model categories directly affect switching intention in relation to travelers’ airline selection. Lai et al. [19] analyzed the switching behavior of customers regarding mobile shopping through the PPM model. Further, Hou et al. [14] unified different individualistic variables within the PPM model to investigate the switching behavior in online role-play games. Thus, we propose that user switching behavior of smartphone brands can be studied through the lens of microscopic analysis to classify individual factors in different categories which will facilitate the development of suitable brand strategies. Table 1 presents the predictors or antecedents of brand switching behavior used by previous researchers in the context of the PPM model along with the summary of those research studies.

2.3. Push Effects. Push factors can be considered as negative factors or disadvantages which lead to switching to a new place or switch from the origin due to cons of the existing place which deteriorates the quality of life or object [17].

Similarly, in this study, the push factors represent the disadvantages of using one smartphone brand over the other. According to Cheng et al. [23], there has been a general conceptual correspondence between different push factors from migration literature and different drivers of switching intentions such as price, quality, trust, and satisfaction. As shown in Table 1, many of the evaluative drivers of switching intention or behavior of customers corresponding to the push factors in migration literature as conceptualized by different authors such as low satisfaction or dissatisfaction, trust issues, poor functionality, or utility.

2.3.1. Poor Customer Service. Customer service can be defined as the excellence of service and overall quality perceived by the customer. Dissatisfaction from the existing or incumbent brand is the primary and key factor to drive people away from their current location [10]. In this regard, Hati et al. [21] also highlighted that dissatisfaction is more likely to cause a psychological effect in customers’ mind to switch the existing brand. The two parts of service performance are core service performance and service encounter performance [24]. As per Cheng et al. [23], customers compare their service expectation with the service performance and the difference between them is considered as satisfaction or dissatisfaction with service as the case may be. A customer who believes customer service to be high would have a positive perception about the brand, and dissatisfied customer who evaluates service quality as low would show a high tendency to switch the brand [25]. In the particular case of the smartphone industry, delay in smartphone repairing or no after-sales service would push the customers to switch to a new smartphone brand or a smartphone brand with a better customer service rating. Previous researchers have stated that dissatisfaction with incumbent service providers or brands has a positive relationship with the brand switching behavior of users or customers [18, 21, 26]. Accordingly, it is hypothesized as follows:

H1a: dissatisfaction with the service of the incumbent smartphone brand has a significant influence on smartphone users’ switching behavior

2.3.2. Obsolete Features. Features that a product carries with itself are traits that help customers to meet needs, wants, and satisfaction out of a product [27]. In case of smartphone industry, it is the combination of hardware and software that synergizes with the intent of purchase by the customers [28]. Adding to it, the latest features and functionality are one of the major influencing factors in the smartphone industry while switching brands [3, 29]. Brands that do not provide the latest features in terms of hardware and software will deliberately push away customers to other brands or competitive brands. The smartphone users specifically emphasize on technical features and specifications of the smartphone which motivates them to switch to an alternative or better brand [30]. For instance, a company that provides obsolete chipset, outdated camera features, and less random-access memory (RAM) and storage space will not be able to maintain customer base for a long period, and eventually its customers will be forced to

TABLE 1: Prior research in the PPM model: push, pull, and mooring effects.

Authors	Sample	Context	Push factors	Pull factors	Mooring factors
Hou et al. [14]	Field survey of 654 online gamers	Online gaming switching intention	(i) Low enjoyment (ii) Involvement of sufficient participants (iii) Low satisfaction from service	(i) Alternative attractiveness	(i) Need for variety (ii) Switching cost (iii) Prior switching experience (iv) Social relationship
Sun et al. [5]	240 students from a university in central China	Switching behavior in mobile instant messaging (MIM) application	(i) Dissatisfaction with the incumbent (ii) Fatigue with incumbent	(i) Attractiveness of the alternatives (ii) Subjective norm	(i) Habit (ii) Affective commitment (iii) Switching cost
Jung et al. [18]	575 passengers from Incheon Airport (95 Chinese, 67 Japanese, and 367 Korean)	Switching behavior in the airline industry	(i) Low trust (ii) Low service quality (iii) Low satisfaction (iv) Pricing problem	(i) Attractiveness of alternatives (ii) Pricing benefits (iii) Opportunity for alternatives	(i) Low prior switching (ii) High switching (iii) Experience (iv) Low variety (v) Seeking (vi) Involuntary choice (vii) Cost
Li [20]	329 users of the myStarbucks app and Starbucks card in Taiwan	Switching behavior between membership cards and mobile applications	(i) Poorly designed aesthetics	(i) Gamification (ii) Locatability (iii) Economic benefits (iv) Transaction convenience	(i) Substitutability inertia
Lai et al. [19]	174 mobile phone users in Taiwan	Customer switching behavior towards mobile shopping	(i) Issue of inconvenience	(i) Peer influence (ii) Alternatives' attractiveness	(i) High switching cost (ii) Low security and privacy (iii) Low trust
Bansal et al. [10]	700 customers of hairstyling and auto repair	Exploring the applicability of push-pull-mooring model	(i) Quality (ii) Satisfaction (iii) Value (iv) Commitment (v) Trust (vi) High price perception	(i) Attractiveness of the alternatives	(i) Variety seeking (ii) Attitude (iii) Switching costs (iv) Previous switching experience (v) Subjective norms
Hati et al. [21]	1171 account holders of Islamic bank	Users migration to Islamic bank	(i) Product (ii) Price (iii) Place (iv) Promotion (v) People (vi) Process (vii) Physical evidence	(i) Product (ii) Price (iii) Place (iv) Promotion (v) People (vi) Process (vii) Physical evidence	(i) Subjective norms (ii) Switching cost (iii) Prior switching behavior (iv) Variety seeking
Zhang et al. [22]	126 bloggers using blog services in Hong Kong	Blogs service switching by users	(i) Satisfaction	(i) Alternative attractiveness	(i) Sunk cost

switch to some other option. The empirical study conducted by Kansra [31] revealed that 79% of the participants feel that better features provided by other brands play an important role while switching to another brand. Clearly, customers will choose or tend to switch to another brand that provides the latest or additional features [28]. Accordingly, it is hypothesized as follows:

H1b: obsolete features have a significant influence on smartphone users' switching behavior

2.4. Pull Effects. Pull factors are expressed as the advantageous factors that lure or attract prospective customers to a new destination [10]. In this study, pull factors represent attractive forces that invite customers to switch to a new or alternative smartphones brand. Existing literature shows that alternative options have a strong and direct influence on repurchasing as well as switching intention and behavior of customers [14, 21–23, 32, 33]. Therefore, we propose that smartphone users are more likely or intended to be pulled towards other smartphone brands in case of factors having

stronger pull effects such as attractiveness of alternatives and image of a brand, as mentioned in Table 1.

2.4.1. Brand Image. Brand image can be expressed as a combination of beliefs, ideas, and impressions that a person holds for an object or a thing [34]. It has been established that good brand image has a positive relationship with customer loyalty, as a company with a better brand image will be able to prevent customers from switching to another brand or retain their existing customers [23, 31, 35]. However, customers might tend to switch to another brand when their needs change and the existing brand fails to cater to their changing needs [36]. An attractive brand image will attract competitors' customers to purchase products offered by the new or alternative brand, thereby pulling customers to switch brands and create a larger and loyal customer base. Similarly, a good brand image will have a positive impact on consumer behavior and little or no intent of switching will occur and thus maintain customer loyalty. According to Khan et al. [37], the brand image demonstrates customers' next buying behavior. In other words, brand image is an important determinant of whether the customer will repurchase or switch brands. Consequently, we hypothesize the following:

H2a: image of a smartphone brand has a significant influence on smartphone users' switching behavior

2.4.2. Product Quality. Product quality comprises features and characteristics that are offered by a product which is then assessed by the customers against their needs and requirement. According to Kim and Park [38], product quality gauges the ability of the producer to meet customers' expectations. Product quality is the actual superiority of the product over the competitors' offerings upon which customers base their decision to purchase or switch based on the overall experience of using the product [39]. In addition to this, product quality is emphasized by many researchers as one of the most important factors on which firms compete as customers are always in search of better quality and it is the quality that transforms markets [3, 10, 39–41]. It is very challenging for companies to produce high-quality products in order to compete with competitors while maintaining a good perception about the superiority of quality among the existing customers, since acquisition cost for new customers is significantly higher than the retention cost for existing customers [42]. It suggests the idea that high product quality is associated with high customer attraction as well as retention.

Poorly perceived quality by customers not only disengages the existing customers with the company but also drifts away the potential customers from the company which ultimately results in the loss of revenue [23]. On the other hand, Nimako and Winneba [13] also mentioned that high-quality products not only satisfy and help to retain the existing customers but also attract customers who are currently using low-quality products. In addition to this, according to Liang et al. [43], perceived product quality can

ensure brand loyalty for a company which in turn helps customers from switching brands. Conversely, if the users think that the quality of an alternative or new brand is higher, it tends to create positive attractiveness among the customers and they tend to switch to such other brands. Based on the above analysis, we propose the following hypothesis:

H2b: quality of a smartphone has a significant influence on smartphone users' switching behavior

2.5. Mooring Effects. Mooring factors are intervening or facilitating factors that comprise of personal, social, or cultural forces that either facilitate the movement of the potential migrants to a new origin or hinder migration to a new location [10]. Mooring effects can be cultural or spatial effects that can help a person feel psychologically good or bad [44]. Mooring factors can either make the decision to purchase, repurchase, or switch either easy or more difficult depending upon personal and social context. Some of the variables in brand switching literature that fit into mooring effects in the context of smartphone usage are switching cost, subjective norms (social influence), past switching behavior, attitude towards switching, etc. (see Table 1). Due to the complexity of migrating decisions, we propose to study some important mooring factors that are discussed below, with an initial justification of the mooring effect of factor in the migration literature and then a precise justification of application of such effect in this study.

2.5.1. Reference Group/Subjective Norm. Social factors are societal norms that include the influence of family members and friends, social status, and the role of family members and friends in the society which directly influences the switching behavior of an individual. According to Schiffman and Kanuk [45], family members and friends form a reference group for the potential customer serves as a basis for influencing future switching and consumption of products. Family members, friends, and relatives provide reliable feedback which has a positive impact on switching behavior and provides a confidence boost to the customer with regard to product consumption as well as satisfaction. Garga et al. [46] stated that while choosing a smartphone brand, customers always keep in mind family, friends, relatives, and coworkers. For instance, owning the same smartphone brand as used by their friends or family members may create a feeling of belongingness and inclusion in the group which facilitates interpersonal relationships whereas not owning the same brand may cause a feeling of exclusion or isolation. The first impressions about a brand are made by the family which subsequently becomes a habit for the customer [47]. For example, a customer who formed perceptions about a brand at a young age might continue to use the same brand at an adult stage too. Social status reflects the position that a person holds in the society in terms of wealth, education, and occupation. Social status also influences switching behavior that whether a customer will switch brand or continue using the same brand depending upon his social status

[48]. Consequently, the brand selection is also reflected by the social status and role of an individual in the society. Based on the above observation, it is hypothesized as follows:

H3a: reference group or subjective norm has a significant influence on smartphone users' switching behavior

2.5.2. Switching Cost. It has been well established that economic conditions play a crucial role in migration behavior and migrants might abandon migration to the new destination due to high migration cost [49, 50]. The migration cost shares similarity with switching cost in the migration and switching literature [14]. Switching cost is defined as the cost that the customers need to pay in order to purchase a product from a new manufacturer or brand [49]. The switching cost does not only include monetary part but also includes nonmonetary aspects such as time, efforts, unfamiliarity with a new product, and uncertainty which is involved in taking migration decision and executing migration behavior [24]. For example, loss of data in changing a smartphone may constitute switching cost for customers which may affect their decision to switch to a new smartphone brand. Switching costs play a direct role in influencing the switching behavior and it has a negative relationship with switching behavior, as high switching cost hinders the movement of people to a new brand and vice versa [5, 19].

In case of smartphone, switching cost can be high or low depending upon the price segment, and therefore, switching cost plays an important role in the customers' mind while switching brands. With the increased penetration rate of smartphones, it has become an everyday essential item for customers [51]. Further, with the introduction of web-based technology and the concept of e-shopping, switching of mobile phones has become easier for customers and this has also pushed smartphone companies to introduce affordable products that offer value for money [19]. Such factors have caused reduced switching cost for smartphone users that stimulate their switching behavior. Based on the above observation, we propose the hypothesis as follows:

H3b: switching cost has a significant influence on smartphone users' switching behavior

2.6. Research Model. This section also addresses relevant definitions and interrelationships among constructs in the research model. In this research model, obsolete features and poor customer service are identified as push factors whereas product quality and brand image are classified as pull factors while switching cost and reference group are considered as mooring factors. All the above-mentioned constructs are designed to be multidimensional, relevant, and specific so that they make sense in the context of switching behavior in the smartphone industry. According to Allen [52], multidimensional constructs have been widely used while conducting and analyzing organizational behavior. A construct is defined as multidimensional when it comprises several distinct but also interrelated dimensions corresponding to a certain literature

[52]. As mentioned above, we identified several subdimensions of the PPM model that were classified into push, pull, and mooring factors. The PPM model served as a useful and powerful method to identify such multidimensional constructs and predictor variables. In addition to this, the flow in the relationships are considered from the dimensions, i.e., taking from first-order constructs (push, pull, and mooring effects) to second-order constructs (obsolete features, product quality, poor customer service, brand image, switching cost, and reference groups). Considering all the three constructs including brand switching behavior, we aggregated these multidimensional constructs in our conceptual framework to make a comprehensive understanding of the brand switching behavior of smartphone users in China. In the next sections, a discussion is made on how these predictors fit into the PPM model and this research.

With formative operationalization, we conceptualized the PPM model as a composition of its different parts. First, the causality flows from the first-order constructs (such as poor customer service and obsolete features) to the second-order constructs (such as push factors). Accordingly, in this study, push, pull, and mooring effects represent the accumulation of their first-order constructs. Second, different elements of one construct are kept interchangeable with each other so as to obtain the same result. For example, poor customer service and obsolete features both represent the push effects in this study, and even if these are interchanged, the results will remain the same. Third, the "pull" factors might have been different predictors than used in the literature to fit in the context of smartphone usage. Overall, the second-order constructs are the results of various first-order constructs.

The universal approach to formulating an SEM model is utmost easily illustrated as follows: Figure 1 represents a simple two-to-one variable model which illustrates many of the ideologies used to construct such models. This figure adopts that the observed data comprises a combination of two x variables (x_1, x_2) and three y variables (y_1, y_2, y_3). For an actual illustration, the independent variables that cause push, pull, and mooring factors lead to burden on the dependent variables, measures of push, pull, and mooring factors, respectively. Then, the model has the following assumptions:

- (i) The observed features x_1, x_2 are strong measures of a latent variable (e.g., push, pull, and mooring factors).
- (ii) A similar set of assumptions is made about the relationships between the observed factors y_1, y_2, y_3 and a second latent variable H_2 (e.g., push and pull factors).
- (iii) Finally, it is assumed that the switching intention of the nonobserved feature H_1 influences the switching decision on the latent variable H_2 . H_2 is also influenced by other nonobserved factors which are represented by the disturbance term E_1 in the equation.

Thus, the path model in Figure 1 can be mathematically expressed in the form of system of simultaneous linear equations as follows.

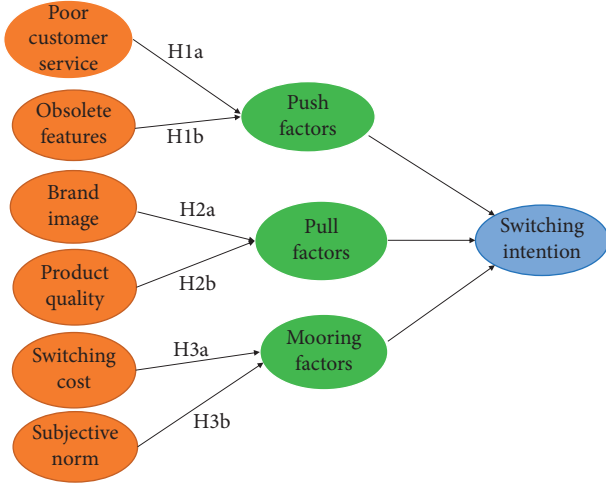


FIGURE 1: Conceptual structural equation model framework.

System of equations (structural equation model):

$$X_1 = Z_1 H_1 + M_1; H_2 = TH_1 + E_1;$$

$$X_2 = Z_2 H_1 + M_2;$$

$$Y_1 = Z_3 H_2 + M_3;$$

$$Y_2 = Z_4 H_2 + M_4;$$

$$Y_3 = Z_5 H_2 + M_5;$$

subject to assumptions as

$$E(X_i) = E(Y_i) = E(H_i) = 0 (i = 1, 2, 3); \text{Cov}(M_i, M_j) = 0 (i = j)$$

$$\text{Cov}(M_i, H_k) = 0 (i = 1, \dots, 4; k = 1, 2); \text{Cov}(M_i, E_1) = 0;$$

$$\text{Var}(H_1) = \text{Var}(H_2) = 1; \text{Cov}(H_1, E_1) = 0.$$

Figure 1 shows the research model that we propose to analyze the smartphone users' brand switching behavior.

3. Research Methodology

3.1. Instrument Development. A self-administered survey was conducted in this research through a well-designed questionnaire to obtain the relevant data and validate the research model. After a thorough investigation of existing literature and the hypothesis development, a comprehensive instrument was developed for the survey. In this section, we present the instrument development procedures and measurement scales. To adopt and utilize the prior research items in this study, suitable changes were made so that they fit accurately in the context of the smartphone segment and make relevant sense in the empirical research context of this study. A total of seven variables were used to conduct this study, comprising six independent (push, pull, and mooring factors) and one dependent variable(s) (switching behavior). Accordingly, the questionnaire comprises of total 25 items based on the seven variables that have been taken from previous research studies in this area. The questionnaire comprised of two sections: demographic and main sections where the demographic section comprised of questions related to age, gender, income, and occupation of the

participants and the main section comprised of questions to measure the main variables of this study. A five-point Likert scale was used to design the questions for each of the variables, ranging from strongly agree to strongly disagree to measure responses in a more expressive manner.

Table 2 presents the key elements of the survey questionnaire including seven variables and 25 items across push, pull, and mooring effects. The push effects comprised of poor customer service (PCS) and obsolete features (OF). The scale used for measuring poor customer service was adopted from the study of Sun et al. [5] while three-item measurement scale of obsolete features was taken each from [54–57]. This is because none of the prior research studies in this area considered the impact of obsolete features in the context of the PPM model. The pull effects comprised of product quality (PQ) and brand image (BI). The perception of the brand image was measured using a three-item measurement scale as proposed by Severi and Ling [53] while the three-item measurement scale of product quality was adapted from the study of Bansal et al. [10]. The mooring effects comprised of switching cost (SC) and subjective norm (SN). The four-item scale to measure switching cost was taken from the empirical research of Hou et al. [14] and the subjective norm was measured by using four-item scale as suggested by Hati et al. [21]. Finally, the measurement scale of switching behavior (SB) was adapted from the work of Lai et al. [19]. The use of prior research items to measure the operational variables increases the validity and reliability of the collected data.

3.2. Data Collection Procedures. The questionnaire was distributed to 250 smartphone users in China who primarily used renowned and top ten smartphone brands used by the Chinese customers, namely, Realme, OnePlus, Honor, Samsung, Huawei, Oppo, Xiaomi, Apple, Meizu, and Vivo [58]. Using the snowball technique of nonprobability sampling method, a total of 250 customers recruited who have changed their smartphone brand in the last twelve months. Also, all the participants had at least two years of experience of using a smartphone. These characteristics match the context of the switching behavior of smartphone users in China to obtain relevant data for this study. In addition, if participants changed more than one smartphone brand, they were asked to give their opinion based on the latest switching of smartphone brand. It was clearly mentioned on the questionnaire that only those participants are invited who have switched from one smartphone brand to other smartphone brands in the last twelve months, not those who have switched from one model of a smartphone brand to another model of the same smartphone brand. For example, if a customer changed his or her smartphone from iPhone 7S to iPhone 11, they did not constitute the population for survey in this research.

The participants were briefed about the study as well as the questionnaire and were humbly requested to fill up true and fair responses through voluntary participation so that the findings can be as accurate as possible. A reasonable time of 30 minutes was given to each respondent to fill up their

TABLE 2: Measurement items.

Authors	Factor	Measurement scale
Hati et al. [21]	SN1	(i) My friends or family members recommend me alternative smartphone brands
	SN2	(ii) My friends or family members are dissatisfied with the use of my existing smartphone brand
	SN3	(iii) My friends or family members have sent me details about new or alternative smartphone brand
	SN4	(iv) My friends or family members use other smartphone brands than mine
Lai et al. [19]	SB1	(i) In the recent time, I have checked product reviews of alternative smartphone brands
	SB2	(ii) Recently, I have searched and checked product information of alternative smartphone brands
	SB3	(iii) Recently, I have searched and checked product price of alternative smartphone brands
	SB4	(iv) Recently, I have switched to a new smartphone brand
Bansal et al. [10]	PQ1	(i) I believe that overall quality of alternative smartphone brands available in the market is higher
	PQ2	(ii) I believe that general quality of my smartphone brand is lower than alternative smartphones in the market
	PQ3	(iii) Overall, I believe that the quality of my smartphone brand could have been better
Severi and Ling, [53]	BI1	(i) My smartphone brand has a differentiated image in the market as compared to alternative smartphone brands
	BI2	(ii) My smartphone brand has clean image in the market
	BI3	(iii) My smartphone brand is well established in the market
Laohakosol and Sharma [54]; Lay-Yee et al. [55]; Osman et al. [56]	OF1	(i) I prefer to have smartphone features compatible with my needs and requirements
	OF2	(ii) I prefer to have both hardware and software feature competitive and technologically advanced in my smartphone
	OF3	(iii) The device specification of a smartphone is important to me
Hou et al., [14]	SC1	(i) I will have to spend a lot of money to switch to a new smartphone
	SC2	(ii) The cost of time and effort to switch from my current smartphone to new one would be high
	SC3	(iii) I would lose a lot of data and treasure if I switch to a new smartphone
	SC4	(iv) Overall, the cost of stopping the use of my current smartphone and using a new one would be high
Sun et al. [5]	PCS1	(i) I feel dissatisfied about by overall service experience of using current smartphone
	PCS2	(ii) I feel unpleasant about service experience while using my existing smartphone
	PCS3	(iii) I feel terrible regarding service experience while using my existing smartphone
	PCS4	(iv) I feel frustrated regarding service experience while using my existing smartphone

responses as a one-time activity. Out of total responses, a total of 246 valid responses were recorded from the participants and the invalid responses were then removed from the study due to missing or wrong response.

Table 3 presents the demographic distribution of the sample for the valid respondents. Among these, the majority of the respondents were young adults (76.8%) who were aged less than 40 years, while only 13% of respondents belonged to the age category of 41–50 years and nearly 10% of respondents were aged more than 50 years, which signifies a greater penetration rate of smartphone among young customers. Further, males accounted for 51.6% and females accounted for 48.4% of total respondents, showing no significant gender difference. Among these valid respondents, 90 out of 246 respondents were single while 144 were married. In relation to annual income, nearly

half of the respondents (45.3%) earned up to CNY 200000 annually while only 34 out of 246 respondents earned more than CNY 300000 annually. In relation to occupation, majority of the respondents were employed (59.8%), 12.6% were student, 24% were business persons, and 3.7% were employed. The analysis of the demographic distribution of the sample suggests that our sample is representative of population for investigating the switching behavior of the Chinese smartphone users.

4. Findings

Structural equation modeling (SEM) technique was used to analyze the interrelationships among the operational variables for two reasons. First, SEM allows analysis of a set of relationships between one or more dependent and one or

TABLE 3: Demographic statistics.

Variables	Particulars	Frequency	Percentage
Age	18–30 years	68	27.6
	31–40 years	121	49.2
	41–50 years	32	13.0
	More than 50 years	25	10.2
Gender	Male	127	51.6
	Female	119	48.4
	Single	90	36.6
Marital status	Married	144	58.5
	Divorced	8	3.3
	Widow/widower	4	1.6
Annual income	Less than 100000 Yuan	39	15.9
	100001–200000 Yuan	97	39.4
	200001–300000 Yuan	76	30.9
	More than 300000 Yuan	34	13.8
Occupation	Student	31	12.6
	Employed (part-time)	47	19.1
	Employed (full-time)	100	40.7
	Business	59	24.0
	Unemployed	9	3.7

more independent variables, facilitating multivariate analysis [59]. Second, SEM involves multiple regression analyses of factors and it is a suitable method for operationalizing high-order factors and multidimensional constructs [60]. Since the conceptual model of this study is based on multidimensional constructs, i.e., first- and second-order constructs, the choice of SEM method was suitable. We employed a linear regression analysis technique using IBM SPSS statistics software v23 to test the model up to the switching behavior of smartphone users. For SEM estimation, we used “SmartPLS3”.

4.1. Reliability and Validity. The scale reliability of the constructs operationalized in this study was evaluated using its Cronbach’s alpha and composite reliability. The critical values for these are 0.70 each [61]. The values for Cronbach’s alpha ranged from 0.77 to 0.98. The results of the Cronbach alpha test were within the acceptable range as shown in Table 4, and therefore, data responses represent high internal consistency among the measures, which was important for our model. Further, composite reliability values for factors ranged from 0.73 to 0.97 which is above the commonly acceptable threshold value. It clearly suggests that there is high Internet consistency for responses of measurement scale items.

We also evaluated the validity of measured items in terms of discriminant and convergent validity. Discriminant validity of measures can be tested using the average variance extracted (AVE) value as an AVE value of more than 0.50 represents high or significant validity for both individual variables and the constructs [62]. Table 4 shows the values of AVE for each of the factors are greater than 0.50, and hence, discriminant validity of the measures is satisfied.

To test the convergent validity of measures, factor loadings for each of the measurement scale items were assessed by

TABLE 4: Reliability and validity test results.

Construct	Cronbach’s alpha	AVE	CR
SN	0.975	0.975	0.975
SC	0.930	0.930	0.930
PCQ	0.770	0.770	0.770
SB	0.980	0.980	0.980
PQ	0.838	0.838	0.838
BI	0.984	0.984	0.984
OF	0.814	0.814	0.814

CR = composite reliability; AVE = average variance extracted.

seeing whether the factor loadings for each construct and all items are high enough. The critical value for factor loadings in this context is 0.50 [63]. For two items, factor loading values were less than 0.50 for BI2 (brand image as a pull factor) having a factor loading value of 0.315 and SN4 (subjective norm as a mooring factor) having a factor loading value of 0.155. Consequently, these two measurement items were removed after validity testing. After removing these two items, as shown in Table 5, the standardized factor loading values for each of the items is not significantly less than 0.50, and hence, the convergent validity of the measures is satisfied.

4.2. Structural Model. In Figure 2, the results of the structural model through regression analyses are presented. Under push factors, the obsolete feature has significant positive effects on customers’ switching behavior ($r = 0.144$; p value = 0.024) while the effect of poor customer service on smartphone users’ switching behavior was found to be insignificant ($r = 0.017$; p value = 0.786), thereby supporting hypothesis H1a and rejecting H1b. In relation to pull factors, product quality has significant positive effects on smartphone users’ switching behavior ($r = 0.193$; p value = 0.002) while brand image did not have a statistically significant effect on the switching behavior of smartphone users ($r = 0.035$; p value = 0.588), thereby supporting hypothesis H2b and rejecting H2a. In relation to mooring factors, subjective norms showed a strong and significant positive effect on smartphone users’ switching behavior ($r = 0.961$; p value = 0.000) while the effects of switching costs were found to be insignificant ($r = 0.016$; p value = 0.805), thereby supporting hypothesis H3b and rejecting H3a. Besides above, in relation to the first-order constructs, all the three factors, i.e., push ($r = 0.145$; p value = 0.008), pull ($r = 0.197$; p value = 0.008), and mooring ($r = 0.961$; p value = 0.000), represented significant positive effects on brand switching behavior of the Chinese smartphone users. Overall, the model explained 89.517% of the variance in users’ behavior to switch to a new smartphone brand.

5. Discussion

The smartphone industry is growing at a higher rate year on year with fast innovations and new inventions every now and then, creating an ever-increasing wider customer base for itself. This makes it imperative to study and identify determinants that either facilitate or hamper the switching behavior of smartphone users. Therefore, this study uses the PPM model which

TABLE 5: Factor loadings.

Measurement item	Extraction
My friends or family members recommend me alternative smartphone brands	0.896
My friends or family members are dissatisfied with the use of my existing smartphone brand	0.965
My friends or family members have sent me details about new or alternative smartphone brand	0.972
My friends or family members use other smartphone brands than mine	Deleted
I will have to spend a lot of money to switch to a new smartphone	0.933
The cost of time and effort to switch from my current smartphone to new one would be high	0.94
I would lose a lot of data and treasure if I switch to a new smartphone	0.524
Overall, the cost of stopping the use of my current smartphone and using a new one would be high	0.964
I feel dissatisfied about by overall service experience of using current smartphone	0.994
I feel unpleasant about service experience while using my existing smartphone	0.994
I feel terrible regarding service experience while using my existing smartphone	0.977
I feel frustrated regarding service experience while using my existing smartphone	0.977
In the recent time, I have checked product reviews of alternative smartphone brands	0.969
Recently, I have searched and checked product information of alternative smartphone brands	0.965
Recently, I have searched and checked product price of alternative smartphone brands	0.969
Recently, I have switched to a new smartphone brand	0.854
I believe that general quality of my smartphone brand is lower than alternative smartphones in the market	0.938
Overall, I believe that the quality of my smartphone brand could have been better	0.938
My smartphone brand has a differentiated image in the market as compared to alternative smartphone brands	0.918
My smartphone brand has clean image in the market	Deleted
My smartphone brand is well established in the market	0.926
I prefer to have smartphone features compatible with my needs and requirements	0.618
I prefer to have both hardware and software feature competitive and technologically advanced in my smartphone	0.846
The device specification of a smartphone is important to me	0.754

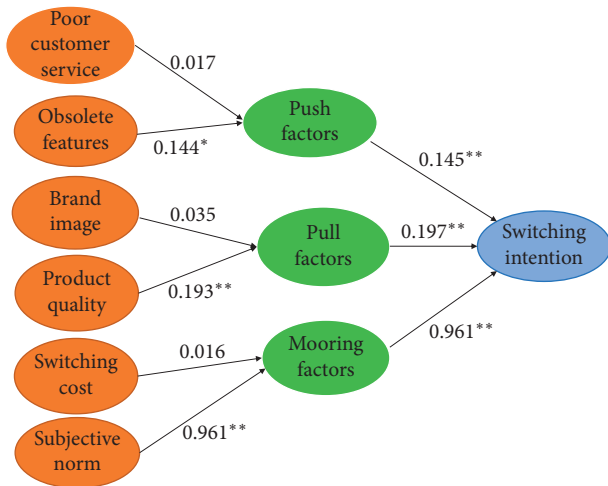


FIGURE 2: Estimated proposed structural equation model. Note: * and ** indicate significance of p values at 0.05 and 0.01, respectively.

originated from migration theory and is considered as one of the most important models to study migration or switching behavior. We identified such determinants and classified them in push, pull, or mooring factors based on previous studies to undertake macroscopic analysis, key findings of which are discussed below. We found that mooring factors have the greatest effect on smartphone users' switching behavior, followed by pull and then push factors.

First, in relation to push effects, two variables were operationalized based on previous studies, namely, obsolete features and poor customer service. Obsolete features showed a significant impact on smartphone users' switching

behavior as no customer wants outdated features in a fast-paced and innovative industry which sees significant technological changes in a short duration of time. The findings about this factor are in the same line with previous research studies which also highlighted the significance of the latest features in smartphones [3, 28, 29]. Another push factor, i.e., poor customer service, showed an insignificant impact on smartphone users' switching behavior which is surprisingly contrary to our expectations and the previous research studies which claimed that dissatisfaction with incumbent service providers or brands has a positive relationship with brand switching behavior of users or customers [21, 25, 26]. The potential reason for such discrepancy in the findings of previous research studies and this study could be because of the availability of a large number of local smartphone repair shops and the fact that customers have become so advanced in terms of technology that they do not require much after-sales service except for hardware replacement in case of physical damage to the smartphone.

Second, the pull effects studied in this research comprised of product quality and brand image. Based on regression analyses, we found out that product quality has a significant impact on the brand switching behavior of smartphone users. This finding is consistent with that of previous studies which also emphasized the importance of high product quality to attract customers [3, 10, 39–41]. Another pull factor, i.e., brand image, showed an insignificant impact on switching behavior on smartphone users which is inconsistent with the previous research studies [31, 35]. However, it should be noted that these prior research studies did not specifically focus on smartphone industry and were studied in the context of other industries or products. The possible explanation for such deviation

could be that brand image does not play a major role in smartphone switching behavior as compared to switching behavior in other products. This is because in case of smartphone usage, customer loyalty is generally developed based on user experience and not solely based on the brand image of the product.

Third, mooring effects considered in this study comprised of switching cost and subjective norm. Regression analyses revealed that switching cost has a nonsignificant impact on the switching behavior of smartphone users which is contrary to the findings of previous studies which state that switching costs play a direct role in influencing the switching behavior and it has a negative relationship with switching behavior, as high switching cost hinders the movement of people to a new brand and vice versa [5, 19]. The rationale behind such contradiction is that a large number of Chinese smartphone makers such as Xiaomi, Realme, Oppo, and Honor are offering low-cost and budget smartphones that offer value for money. China is a price-sensitive market which has forced many companies to make affordable phones [19], thereby reducing the impact of switching cost. In relation to the second mooring factor, i.e., subjective norm, findings revealed that subjective norm has a strong and significant impact on the switching behavior of smartphone users which is similar to the findings of previous research studies [45, 46]. As expected, subjective norm has the greatest effect on the switching behavior of customers as smartphones have now become an icon for displaying the lifestyle of people, and due to this, social factors play a crucial role in this regard. Moreover, the significance of this finding can be understood as many smartphone companies use referral programs to reduce out-switching behavior and encourage in-switching behavior.

5.1. Theoretical Implications. Our study contributes to the literature in many ways. First, this study provides useful insights and a significant theoretical understanding on the switching behavior of customers in the smartphone industry. Previous research studies conducted on switching behavior on smartphones considered mainly individualistic factors and their impact on switching behavior [3, 8, 31, 46]. On the other hand, our study adopted a holistic and macroscopic view by conceptualizing the PPM model which is considered an important tool in understanding switching behavior. Also, the PPM model has been widely used in various research studies in various fields; however, the literature is still undeveloped in the specific context of smartphone switching behavior [19].

Second, we enriched the conceptualization of the PPM model by studying variables in the specific context of smartphones which influence users' switching behavior. Previous research studies that conceptualized PPM model in studying switching behavior mainly used general constructs such as switching cost, satisfaction, and subjective norm. In addition to these general constructs, we used variables such as obsolete features, poor customer service, product quality, and brand image that have not been much regarded in the previous research studies and which we consider as important factors in the switching behavior of smartphones. We

incorporated these factors in our study and found out that product quality had a statistically significant impact on switching behavior while brand image turned out to be insignificant in the context of smartphone switching behavior. Till date, little emphasis has been given on constructs that define unique characteristics in specific research contexts.

Third, our study revealed that the push effects were weaker than pull effects and the mooring effects exhibited the strongest effect on the switching behavior of smartphone users. Although poor customer service and obsolete features of a smartphone may push customers away, yet the attraction by pull factors and intervention of mooring factors such as subjective norms may have a more important influence on the switching behavior of smartphone users. The results of our study that pull effects have stronger than push effects on switching behavior are consistent with that of previous studies [18, 64].

5.2. Practical Implications. From the practical perspective, this study provides key insights to both incumbent and new players in smartphone industry regarding factors that play a major role in the switching behavior of users and factors that help to retain customers. Subjective norm was found to be the most important factor contributing to the switching behavior of smartphone users. To capitalize on this finding, smartphone companies should incorporate and adopt some new policies such as referral program, insisting customers to recommend their products to friends and family which ultimately increases the customer base. Also, out of the three first-order constructs, mooring factors were found to have the strongest effect influencing switching behavior, which points out that more attention is needed towards mooring factors by the management of smartphone companies.

Regarding push factors, obsolete features have a significant impact on switching behavior which implies that companies need to constantly upgrade their products and deliver the latest technology to their customers to sustain in the competitive market, whereas poor customer service did not play a major role in influencing switching behavior which implies that smartphone companies need to focus more on the core product than on customer service and after sales. Incumbent smartphone companies are suggested to continually invest in research and development function and strengthen their product development capability to retain customers.

Lastly, brand image did not have a significant impact on switching behavior which suggests that if new companies deliver quality products, then brand image does not play a significant role in influencing switching behavior. While product quality played a significant role in switching behavior, companies must constantly focus on delivering hi-tech and quality products. Due to the introduction of low cost and affordable segment in smartphone industry, many new players have an opportunity to enter the market.

5.3. Study Limitations and Future Research. We have identified some limitations in this research that can be improved and addressed in future research studies. First, we investigated the determinants of the switching behavior of

smartphone users in a single geographic area, i.e., China. Due to this, our samples were confined to China. Since the smartphone penetration growth rate is significantly growing around the world, an explanation of cross-cultural understandings in the context of this research may help smartphone companies to create an understanding on the switching behavior of customers from a global perspective. In order to tailor to individual needs of smartphone users across countries, research studies on cross-cultural understanding in switching behavior literature may help the smartphone companies with useful findings. In addition to this, among the valid respondents, majority were young adults (76.8%) who were aged less than 40 years. Therefore, this study can be replicated to the needs of older users in order to validate the findings of this study.

Second, we constructed dependent variable as switching behavior and did not include switching intention in our study. Since the theory of planned behavior postulates that the voluntary behavior of human beings is preceded by their intention of engaging in such behavior, further research studies in this area may consider the conceptualization of the theory of planned behavior in switching literature. The theory of planned behavior has been widely studied in diverse context of behavior and intention [65, 66].

Third, the generalizability of this study can be limited as data analysis was based on 246 valid responses. Due to the coronavirus pandemic, the data collection process was not conducted extensively and a reasonably acceptable sample was targeted for 250 participants. In further research studies in this area, the sample size can be increased to increase the generalizability of findings as well as to validate the results of this study. SN = subjective norm; SB = switching behavior; PCS = poor customer service; PQ = product quality; BI = brand image; OF = obsolete features; SC = switching cost.

Data Availability

All results reported in this research were carried out in SmartPLS3 computational environment. A self-administered survey was conducted in this research through a well-designed questionnaire to obtain the relevant data and validate the research model. Data will be provided on personal request.

Conflicts of Interest

The authors declare no conflicts of interest.

Authors' Contributions

Jin Guo, Shan Shan, Yu Wang, and YA Khan conceptualized the study and were responsible for methodology, Yu Wang and YA Khan were responsible for software and validated the data, Jin Guo, Shan Shan, and YA Khan performed formal analysis, Jin Guo, Shan Shan, and Yu Wang prepared the original draft, reviewed and edited the manuscript, and visualized the study.

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